IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Francesca Kuglen	**Atty Docket:**	K551-003.B
Serial No.	:	10/764,279	**Examiner:**	Robyn Kieu Doan
Filed	:	January 22, 2004	**Art Unit:**	3732
For	:	STRETCH COMB HAIR RETAINER	**Conf. No.:**	9690

RULE 132 DECLARATION OF STAN REYES (37 CFR 1.132)

This declaration is offered in support of the above-identified patent application by Francesca Kuglen.

I, **Stan Reyes**, declare as follows:

1. I am a mechanical engineer residing in Cupertino, California. My educational background and work experience are provided in my resume attached hereto as **Exhibit A**.

2. At the request of Francesca Kuglen, I tested the relative holding strength of a wire loop comb versus a plastic comb in different volumes of human hair simulated by using different numbers of commercially available hair wefts layered one over the other. Tests were done using two wefts to seven wefts. This was to simulate a range of hair thicknesses from very thin hair to relatively thick hair.

3. My tests showed that the wire loop combs had relatively little holding strength as compared to the plastic comb. There was no significant increase in the holding strength of the wire loop comb as the hair volume (thickness) increased. By contrast the holding strength of the plastic comb increased markedly as hair volume increased. At the thickest hair I tested (7 wefts), the average holding strength of the plastic comb was close to 5.5 times that of the wire loop comb. At the lowest number of wefts (2 wefts), the plastic comb had an average holding strength of close 1.5 times that of the wire loop comb.

4. My detailed test report is attached hereto as **Exhibit B**.

The undersigned declares that all statements of her own knowledge made herein, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-identified application, or any patent issuing thereon.

Date: 12/10/2009

Stan Reyes

Application No. 10/764,279

Declaration of Connie Stan Reyes

37 CFR 1.132

EXHIBIT A

Stan Reyes
21075 Lavina Ct., Cupertino, CA 95014
(415) 420 2227
stan.reyes@gmail.com

Education:
San Jose State University, 12/08, San Jose, CA
Bachelor of Science in Mechanical Engineering
*Concentration in Fluid and Thermal Systems

Relevant Courses/Skills:
*Alternative and Renewable Energy Resources
*Dynamic Systems Vibrations and Controls
*Electronics Packaging and Design
*Experimental Methods
*Machine Design
*Thermal Systems Design
*Mechatronics

CAD/ Analysis Tools:
*Autodesk AutoCAD
*Dassault Systems SolidWorks 2007-08
*SolRad Solar Calculator
*National Instruments LabView

Work Experience:
Brechtel Manufacturing, 05/09-Present, Hayward, CA
Mechanical Engineer
*Organize and implement new assembly line to reduce manufacturing and assembly time by over 30%
*Redesign current PILS device by reducing space and to possibly create a portable PILS

SciGene, 04/08 – 08/08, Sunnyvale, CA
Mechanical Engineer intern
*Established a data logger test to optimize PID settings for new temperature controller for fast on target temp response and control
*Designed new incubator assemblies and parts on SolidWorks 2008
*Modified and redesigned prototyped products for trial testing at potential users facilities
*Drafted in SolidWorks 2008 for new parts to send out for manufacturing

Bloom Energy, 02/07- 06/07, Sunnyvale, CA
Quality and Process Engineering Intern
*Helped create Supplier 5 Step program, a points based system to help determine a suppliers worth. ISO requirements, shop cleanliness, turn around time, customer service and final parts quality were some of the grading criteria
*Systematized Supplier Corrective Action Requests to track all failed and defective parts
*Audited and revised Process Build Chart for Master Build Book on the 5kW fuel-cell system to keep manufacturing line updated on all revisions on new parts
*Conducted autopsy analysis on reformers with endoscope

Maxim Integrated Products, 06/06 – 09/06, Sunnyvale, CA
Mechanical Engineering Interface Group Intern
*Designed and manufactured package interface devices for test handlers using AutoCAD, CircuitCAM and LPKF
*Used AutoCAD to draw and dimension built interface devices for archiving
*Machined and modified test equipment and circuit boards
*Machined a custom power supply for the test engineering group

Projects:
Human Powered Vehicle Competition, 04/08
Project Leader
*Created a human powered vehicle which emphasizes everyday usefulness like a car
*Recruited voluntary team members for design, fabrication and competition of HPV
*Designed in SolidWorks and fabricated the 2006, 2007 and 2008 challenger vehicle

Society of Automotive Engineers Mini Baja, 06/08
Technical Director
*Designed and fabricated chassis and suspension for the 2008 SJSU vehicle
*Modeled components in Solidworks 2007 to be used in Finite Element Analysis

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EXHIBIT B

Hair Comb Holding Strength and Pull Tests

Requested by Francesca Kuglen

Performed by Stan Reyes

Mechanical Engineer

December 8, 2009

Purpose:

To test relative holding strength of wire and plastic combs in human hair.

Conclusions

The Plastic Comb has a significant advantage in holding strength due to the high elasticity of material (plastic) and design features (the slit in the teeth). **On two weft layers, the Plastic Comb has an average holding strength 1.47 times that of the Wire Comb, and by the seventh weft, the Plastic Comb has an average holding strength 5.48 times that of the Wire Comb.**

The Wire Comb has a significantly lower holding strength capacity because of the malleability of the metal wire used. Although the teeth also have an opening in the center (similar to the teeth on the Plastic Comb) due to the weak elasticity of the metal, versus the spring action of the plastic teeth, it is technically impossible to create the same type of clamping force without a significant change in material choice. Although the metal wire teeth change shape to accommodate hair passing between the teeth, they do not exert the clamping property noted in the Plastic Comb. Additionally, the teeth of the Wire Comb do not spring back into their original shape like the Plastic Comb teeth. The absence of this ability hampers the holding strength significantly and the Wire Comb will not secure as effectively in hair as the Plastic Comb .

These trends can be seen in the graphs below. For the Plastic Comb, as the thickness of the hair increases, the teeth have the ability to accommodate the increasing thickness and still offer a significant clamping force onto the hair. The teeth return to their original shape, without deforming, no matter how thick the wefts of hair used.

With the Wire Comb, the trend shows that increases in thickness allow the teeth to separate, but not return together, and thus cannot provide a clamping force like that of the Plastic Comb. This is evident as the teeth in the Wire Comb remain visibly separated after being placed in the hair and removed. As for the Plastic Comb, the teeth could be moved apart with a significant amount of force and because of the elasticity of the material, it would still return to their original shape. The Wire Comb had its best holding strength at the point where the teeth were not forced to move out of position and return some clamping force back to the hair. Any movement of the teeth apart led to a permament defomation of the teeth rendering the comb useless. Consequently, the holding strength of the Wire Comb varies throughout the different weft layers, but does not show a significant increase in holding strength with the increasing thicknesses, like that of the Plastic Comb.

Background

The tests for holding strength were conducted using a specially built Test Rig. Wefts of human hair were secured to the Test Rig by clip and a single comb with an additional device to hold weight was added to the wefts in a series of tests. A Cen-Tech digital scale that reads in grams, ounces and pounds with accuracy to a hundredth of a pound was used to calculate weight.

Tests were done on two different types of combs, both widely available and purchased from the same local Walgreen's store. Both combs were the same length and width at 3" long and 1.75" in depth. Comb #1 is a metal wire comb; Comb #2 is a plastic comb, photos of each can be seen below. The human hair tested was purchased from a Beauty Supply store open to the public. The test was done on NYK brand, 10inch length, and style/color No. 2. The wefts of hair were cut into 3-4 inch sections, randomly layered on top of each other, and joined together with a clip on the test rig. The wefts ranged from two to seven layers with two wefts intended to represent very thin and seven wefts intended to represent thick human hair. Using different thicknesses also simulated different areas of the human head where the combs could possibly be placed and worn.

The comparison of Plastic Comb and Metal Wire Comb, measures the difference in "holding strength" of each comb, essentially how well the comb would hold in place in human hair of different thicknesses.

Procedures

<u>Each test was conducted as follows:</u>

1) A light wire was mounted in the middle of each comb "spine" which allowed gram weight to be added and the weight distributed evenly across the middle of each comb

2) The wefts of human hair were placed into the rig by a clip at random. The comb was placed in the hair in the strongest holding position possible. This was done by pushing the comb through the hair perpendicularly and then rotating it to have the teeth pointed downward, parallel to the hair. This gave the combs the best (strongest) position to hold the weight.

3) Weights, in the form of galvanized washers, were placed onto the wire one by one. Weight was then incrementally increased until the comb would not hold in place on its own, and fell completely out of the hair. The weights were then taken off the wire, and weighed in grams on a digital scale. The quantity of weight was recorded in grams and entered into a spread sheet. A trend line was added to each data point to show the strength of the combs with increasing weft layers.

4) Testing began at a starting (thinnest) weft layer of two and proceeded through seven weft layers. The results were graphed: amount of weight versus test number. This shows the holding strength of each comb as a function of hair thickness and the amount of weight each comb can withstand with each changing thickness. The tests were repeated nine times except f or test number one.

The results of the tests can be seen below.

Figures below show the holding strength of Plastic Comb in increasing hair thicknesses.

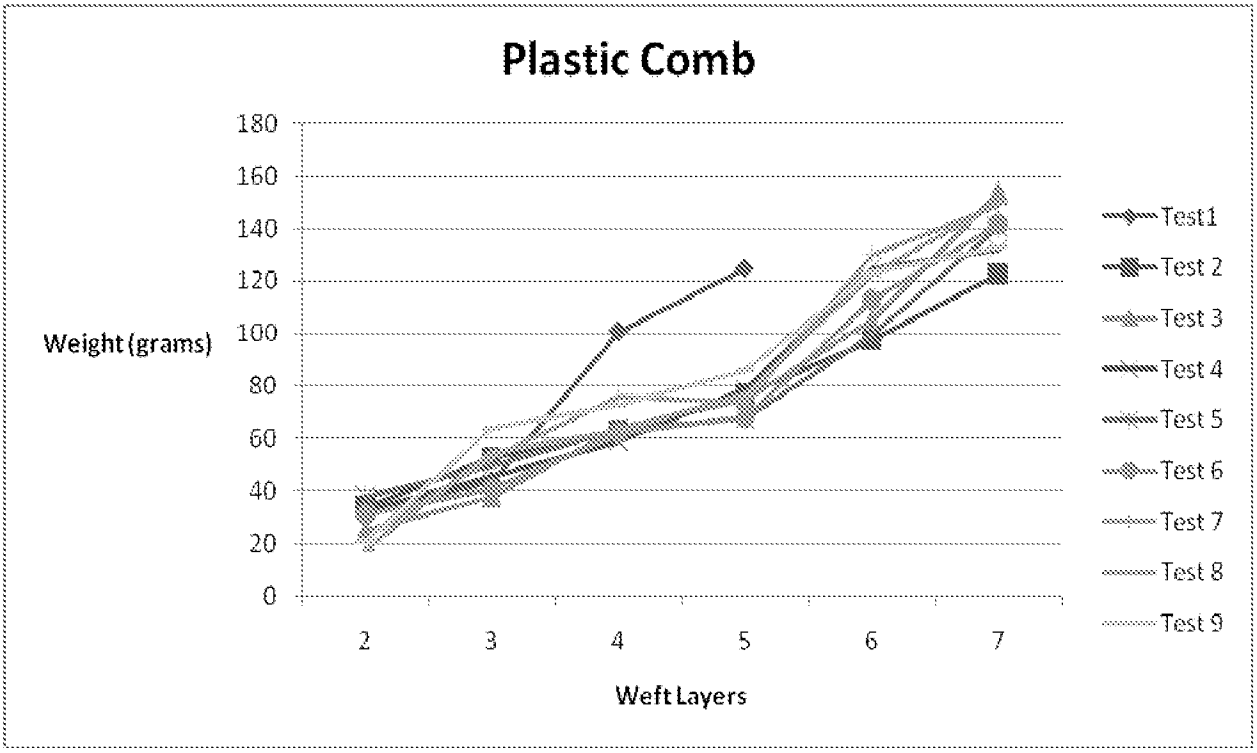


Figure 1. Plastic Comb Test Results

Results

For the Plastic Comb, with the increase in thickness of the wefts of hair, the amount of weight that the comb was able to sustain was very high. On test number 1 between wefts 4 and 5, intended to simulate "average" hair thickness, it was able to sustain nearly 125 grams before being completely pulled out. By the seventh weft layer, the weight averaged between all tests was 140.5 grams. The graph shows that there was a steady increase in holding strength as the thicknesses of hair increased. This is mostly due to the design of the teeth used in plastic combs. The thin gap between the teeth and the split tooth design along with the material choice of plastic allows for the teeth to have some elasticity, while the comb itself remains rigid. This allows the teeth to act as a spring, giving a higher clamping force against the hair as the thickness increases. This design contributes to plastic combs high holding strength as the thickness increases.

Figure below shows the holding strength of Wire Comb in increasing thicknesses.

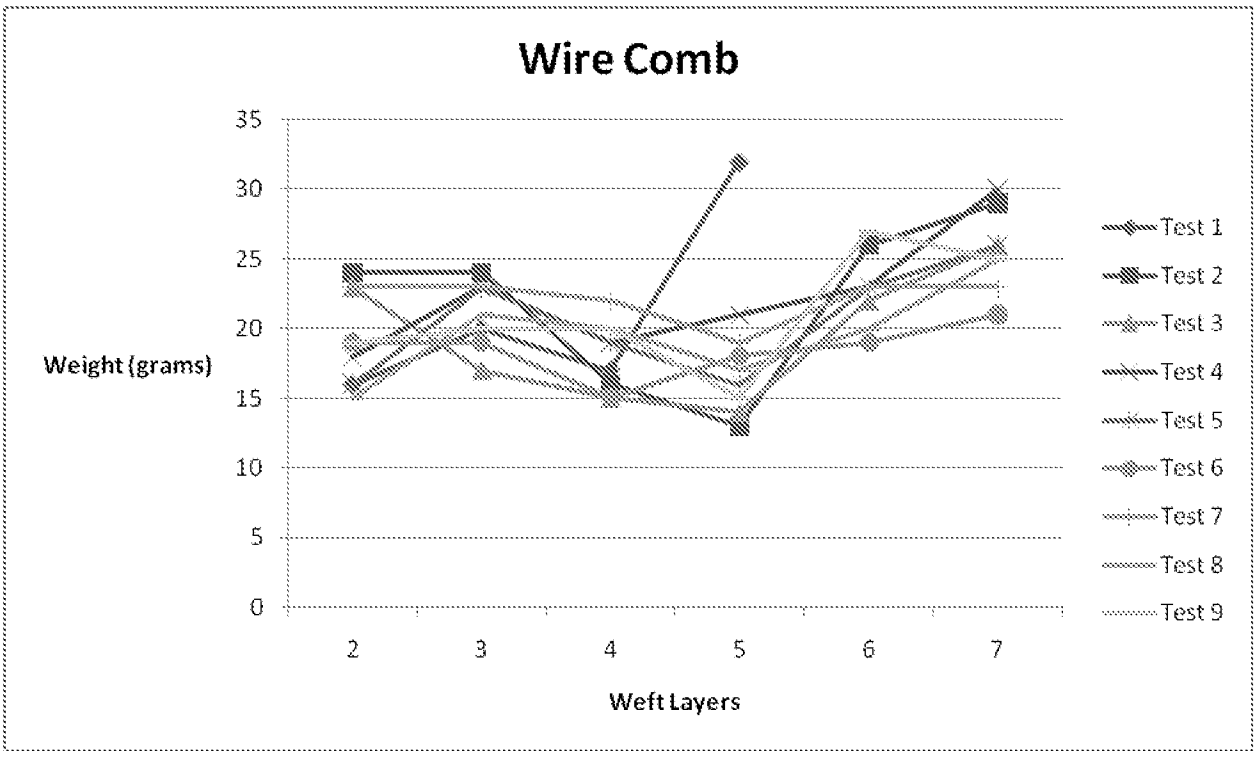


Figure 2. Wire Comb Test Results

Results

For the Wire Comb , with the increase in thickness of the wefts of hair, the amount of weight that the comb was able to sustain was very low. Beginning with the initial weight test of the two wefts of hair, the Wire Comb averaged a few grams lower strength than that of the Plastic Comb. When the weft layers increased, the wire combs' ability to hold onto the hair did not steadily increase. This is mainly contributed to the material of the Wire Comb. The metal wire being used does not have the high elasticity that the Plastic Comb possesses. From the graphs shown above, the Wire Comb shows no significant increase in clamping strength as compared to that of the Plastic Comb. The metal teeth are more susceptible to a change in shape because of the combined forces of inserting the Wire Comb into the hair and the thickness of the hair which contributes to its non increasing strength. The deformation of teeth is also the cause for the slight inconsistencies in the holding strength in different layers of hair.

The results of the tests show that the Plastic Comb has a significant amount of holding strength in comparison to the Wire Comb. The holding strength difference between the two combs is apparent from the beginning tests. On two weft layers of hair the largest amount of weight the Plastic Comb held was 38 grams compared to the Wire Comb's highest at 24 grams

As the thickness of the hair increased the Plastic Comb was able to hold steadily increasing weight, ending with a high of 154 grams on seven weft layers, compared to the high of 30 grams for the Wire Comb.

On two weft layers, the Plastic Comb has an average holding strength 1.47 times that of the Wire Comb, and by the seventh weft, the Plastic Comb has an average holding strength 5.48 times that of the Wire Comb.

Notes on Wire Test

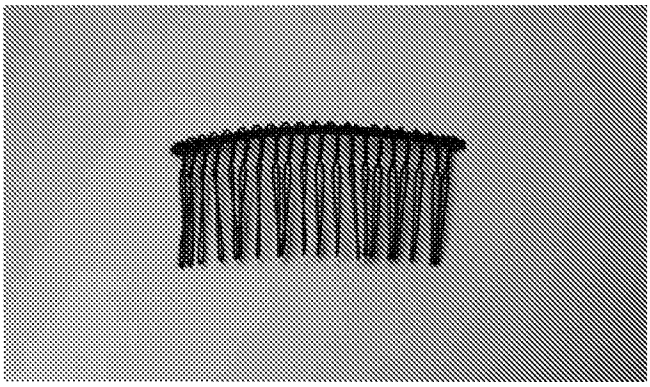
In the first initial test however, (see Fig 2.) on the fifth weft of hair, the Wire Comb had an anamolous increase in holding strength. This increase happened during the first test because the wire comb slid down the layers of hair and became tangled. The tangling caused it to hold in place and take higher weight, albeit not in a way an average woman would wear a comb in her hair. The testing run from the second to seven layers of hair wefts mirror that of the remaining tests.

Test number 1 I stopped the testing at the fifth weft because of the entanglement of the wire comb and I did not proceed with any additional tests for either comb for test 1.

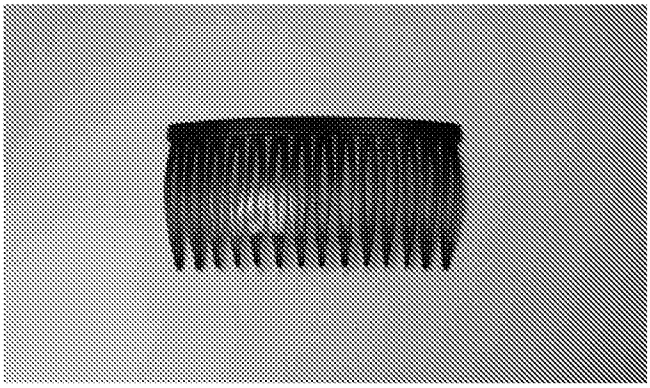
The tables below show the raw data from the test runs.

Weft Layer	Test 1 (g)	Test 2 (g)	Test 3 (g)	Test 4 (g)	Test 5 (g)	Test 6 (g)	Test 7 (g)	Test 8 (g)	Test 9 (g)	Plastic
2	33	34	25	33	38	31	22	18	21	
3	44	53	38	46	50	41	53	55	64	
4	101	63	64	59	64	62	76	63	73	
5	125	77	75	79	68	68	74	77	86	
6		98	105	125	100	113	130	123	123	
7		123	133	132	141	142	149	150	154	

Weft Layer	Test 1 (g)	Test 2 (g)	Test 3 (g)	Test 4 (g)	Test 5 (g)	Test 6 (g)	Test 7 (g)	Test 8 (g)	Test 9 (g)	Wire
2	16	24	23	18	16	19	23	15	19	
3	20	24	17	23	23	19	23	21	20	
4	17	16	15	19	19	15	22	20	20	
5	32	13	14	21	16	18	19	17	15	
6		26	22	23	23	19	23	20	27	
7		29	26	30	26	21	23	25	25	



Wire Comb #2



Plastic Comb #1